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## *Chapter 4*

### THE INVESTMENT DECISION AND THE DEMAND EFFECT

HAS DEPRECIATION liberalization acted via the demand effect to increase modernization outlays? In order to shed light on this question the present chapter, based entirely on the interview material, examines how the investment decision is made.

It is important, first of all, to determine if the investment decision-making process reflects the effects of depreciation liberalization. The decision to modernize involves, fundamentally, determining whether replacing an existing facility with a new one would have the effect of reducing unit costs of output, thereby increasing net revenues sufficiently to cover the capital cost of the acquisition. It is appropriate, then, to raise the general question: Does the investment decision also take account of the effect of depreciation liberalization on net incomes and capital costs?

Second, we are interested in the type of investment computation formula used. Does it measure the effect of depreciation liberalization on net revenues or on the capitalized value of the net revenues expected over the facility's lifetime? If the type of investment computation is discounted cash flow, the tax effect of liberalized depreciation will be revealed to management in the form of higher (after-tax) anticipated rate of return or higher (after-tax) present value of the anticipated streams of returns. If an after-tax pay-back formula is used, the tax effect of liberalized depreciation will appear as a shorter period required to recoup the initial investment. In either event the tax effects are evident. On the other hand if a formula is used which ignores the

tax effect (for example, a pretax pay-back formula), the tax savings due to depreciation liberalization are not made explicit and do not serve, more or less automatically, to increase the demand for modernization.

Third, the demand effect may occur even though the effect of the tax savings is not made explicit by the investment computation. This is possible even where pretax formulas are used if management recognizes the general proposition that liberalized depreciation serves to increase the rate of return or to reduce the pay-back period and accordingly revises its rules of thumb for judging acceptability of investment proposals.

Finally, there is a modernization issue of special interest to the textile industry: whether to modernize by modifying existing equipment or by purchasing new equipment. Is this decision influenced by liberalized depreciation?

Accordingly we ask four questions. (1) What factors are taken into account in arriving at the decision to modernize? (2) What investment formulas are used? (3) Is there evidence that the effect of tax savings on return or pay-back is recognized even in those cases where pretax investment formulas are used? (4) Has liberalized depreciation served to alter the decision to modernize by purchasing new equipment rather than by modifying the old?

#### FACTORS IN THE DECISION TO MODERNIZE

##### *Cost and Savings Included in the Investment Calculation*

It was not possible in the course of the interviews to collect a detailed statement relating to costs and savings included in the investment calculation, but firms repeatedly emphasized that direct labor costs were the principal ones involved in modernization (see Table 3). Several firms made no attempt to include other costs, although others did estimate costs or savings due to selected factors such as reduced maintenance, working capital, or waste, and some endeavored to track down a variety of costs. In every case for which such information was supplied wage rates and selling price of the final product were assumed to re-

TABLE 3. Selected Information Relating to Use of Investment Computations

<i>Company<sup>a</sup></i> (1)	<i>Type of Formula</i> (2)	<i>Costs Considered</i> (3)	<i>Criterion of Acceptability</i> (4)
A	Pretax pay-back	Considers only labor cost savings. States, "very informal system."	No cutoff, but states "very informally, look for four years. No adverse factors are included." States, "if we had considered all factors . . . would never have done all the things we did."
B	Pretax pay-back	Company uses very elaborate cost studies. Investment credit included on pretax basis.	No cutoff, but anything over five year pay-back gets special study before acceptance.
C	Pretax pay-back	Principally labor costs. Not sophisticated. Company has no expansion program. Most projects are of modernization, pay-back type.	No cutoff. Company uses pay-back to establish priority in spending cash flow.
D	Pretax pay-back	Labor, waste, materials, repairs, supplies computed. Company is very pay-back conscious. Executive states, "We try to measure everything."	Uses same criterion for all projects. States, five year pay-back is "very acceptable . . . anything over seven years . . . would look at very hard."

E	Pretax pay-back	Tries to track down all costs and all savings.	Three-five year pay-back gets submitted to top management automatically. Above that "gets very close scrutiny."
F	Pretax pay-back (except return) on investment for new plants	<sup>b</sup>	Five years. States company usually has enough projects under five years to use up cash flow.
G	Pretax pay-back	<sup>b</sup>	Usually five year maximum, but may not accept lowest pay-back. Decision affected by quality and other competitive factors.
H	Pretax pay-back	<sup>b</sup>	Company "looks for five year pay-back or better." "Quality improving" investment doesn't have cutoff. Quality dominates many decisions, probably 50 per cent.
I	Pretax pay-back	Almost entirely labor savings.	Five year cutoff. Same criterion is used for all projects <i>if using formula</i> . President owns and runs company. He doesn't always use formula. May ignore if he sees something he wants to make the operation modern.

(continued)

TABLE 3. (continued)

<i>Company</i> <sup>a</sup> (1)	<i>Type of Formula</i> (2)	<i>Costs Considered</i> (3)	<i>Criterion of Acceptability</i> (4)
J	Pretax pay-back	Direct cost savings.	Four years if project can be "figured." Executive states "always figure if we can. Executive states president is very pay-out conscious."
K	Pretax pay-back	Direct cost savings.	States company tries to cutoff at six-seven years, but may go seven-eight years.
L	Pretax pay-back	States "savings" computed but procedure is "informal." Principally labor costs considered.	States "would get leery if over seven years . . . have gone to ten years."
M	Pretax pay-back	<sup>b</sup>	No cutoff Executive states, " . . . have no trouble finding opportunities with two-three years pay-back which take up our capacity to spend or willingness to spend."

N	Pretax pay-back for equipment. New plant uses after-tax return or investment (based on straight-line depreciation)	Principally labor savings.	Executive states he doesn't know of any cutoff. Says two-three years on labor saving projects has been the average.
O	Pretax pay-back	Principally labor savings.	Four-six year cutoff. Same criterion used for projects. Company tests all projects with pay-back formula.
P	Pretax pay-back	<sup>b</sup>	States top management takes tax savings into consideration but not in computation. All projects cannot be evaluated, but uses same criterion where savings can be estimated.
Q	After-tax pay-back	Principally direct costs. Charges interest on investment recognize DDB in computing taxes.	Three-four year pay-back on all projects which can be measured.
R	After-tax pay-back (uses pretax pay-back for screening)	Direct costs. Carrying costs of extra inventories but not wastes and maintenance costs. Recognizes tax savings from accelerated depreciation.	No cutoff. Typically uses cost computations, but there are some projects which must be adopted to "stay in business."

(continued)

TABLE 3. (concluded)

<i>Company<sup>a</sup></i> (1)	<i>Type of Formula</i> (2)	<i>Costs Considered</i> (3)	<i>Criterion of Acceptability</i> (4)
S	After-tax pay-back	Tries to track down all costs and savings. Recognizes DDB in computing taxes.	States same pay-back criterion (not given) used for all projects. Executive states company is very pay-back conscious.
T	After-tax pay-back	b	b
U	Primarily discounted cash flow	Company attempts to trace down all costs and all savings. Recognizes tax savings from accelerated depreciation. Company is very capital budget conscious. Tests projects with care. Imputes value of intangible considerations.	Uses different criteria for each of three classifications: new lines, replacement of existing machinery, necessary projects to stay in business; criteria not given.
V	Various formulas: discounted cash flow, return on investment, after-tax pay-back	Company attempts to track down all costs. Recognizes tax savings from accelerated depreciation.	Not given. In general submits all projects to test. "Company is very cost conscious."



W	Net return on investment after taxes and after-tax pay-back	Direct costs plus expenses including start-up costs and necessary carrying costs of working capital.	10½ per cent return on investment is major objective. Would accept lower rates if "needed to." Company always uses formula. Value of "other considerations" estimated.
X	After-tax pay-back and net rates of return on investment (after-tax) during pay-back period	Includes additional working capital requirements plus labor savings. Includes investment credit.	Five year pay-back.
Y	Net rate of return on investment and pretax pay-back	Savings include direct labor maintenance. Investment tax credit and tax savings due to accelerated depreciation recognized.	Pay-back is basic hurdle. Rough rule is five year pretax pay-back but check on rate of return (after tax savings). Same criterion for all projects.

SOURCE: Compiled from interview material.

<sup>a</sup> Company alphabetical designations are used to protect confidential nature of interview material.

<sup>b</sup> No information available.

main at current levels. In every case firms stated that computations were based on an assumed full capacity operation of 120 hours per week.<sup>45</sup>

In general, firms made no effort to quantify gains which might accrue from improved quality. Only one firm stated that it required the executive submitting the proposal to make such an estimate. This firm believed that there was a dollars and cents advantage in having "first call" (the first preference of customers) in the marketing of its fabrics. Such a preferred position due to consistently high quality enabled its mills to run full time, and the executives were required to estimate the advantage.

In like manner, savings due to improved labor morale, reduction in floor space used, and improved flow of work are not estimated. The difficulties encountered in estimating such savings as well as savings due to the improvement in quality were mentioned by a number of firms. A favorite example was the installation of air conditioning, which was said to result in improved quality and to have an effect on labor relations. Only one firm (that mentioned above) attempted to estimate pay-back or rate of return on air conditioning.

Management appeared to be aware of these factors, however, even though it did not attempt to quantify them in the investment computation. The interviews indicate that such factors were introduced qualitatively as elements of judgment. A typical expression was, "we take these matters into consideration."

The interviews leave little doubt that computations of savings comprised a principal basis for judging the desirability of modernization proposals. Executives pointed out that such proposals usually anticipate results which are to a considerable extent measurable. In modernization projects the end product is usually not altered significantly (although quality may be improved), the objective being primarily to reduce production costs per unit of output.

Moreover, when only a limited number of costs or cost savings

<sup>45</sup> This information is gathered from answers to question 4. Several firms stated that they could recall cases in which full capacity had not been assumed but that these were exceptions to the rule.

are considered, it should not be concluded that estimates are made in a careless or haphazard fashion. Large and medium sized firms typically have cost engineering departments and smaller firms attempt to estimate savings from experimentation within the plant by supervisory personnel. In some instances consulting engineers are employed, and firms work closely with engineering representatives of textile equipment firms. The latter, because of long standing relationships, tend to take a conservative approach and to make cost estimates which mills consider with close attention.

The tax treatment of depreciation allowances, of course, is not related to the reduction in variable costs. Nevertheless, it is important to establish at the outset that in this important area of investment decision making, management has displayed a high degree of objectivity. Given this focus on increase in earnings, a very strong case can be made that the effect of depreciation liberalization in increasing the return on investment or reducing the pay-back period will be comprehended by management over time. Where it is not understood at present a "learning process" may be anticipated.<sup>46</sup>

#### *Cost of Capital: Risk of Obsolescence and of Other Factors*

While not calculated with the same precision as are variable costs, factors affecting real capital costs are also taken into account. One such factor is the rate of obsolescence resulting from technological advance. Other things being equal, acceleration of such advance increases the risk of investment in depreciable facilities since it becomes likely that the economic service life of any newly acquired facility will be reduced. Accordingly, the amount of the investment to be recovered per year may be increased, enhancing the possibility that the full cost of the facility may not be recovered.

Depreciation liberalization bears on the weight of these factors in the investment decision. Since liberalization accelerates the

<sup>46</sup> See Ture, *Accelerated Depreciation in the United States, 1954-60*, pp. 27-33, for evidence of growing appreciation by business of the advantages in using accelerated depreciation methods.

rate at which the investment in production facilities may be charged off against taxable income, it offsets, in part if not entirely, the effect of a reduced economic service life due to rapid technological advance. In other words, it tends to offset the greater risk in modernization investment resulting from accelerating technical progress. The reduced tax liability from depreciation liberalization in the years immediately following acquisition of new facilities may also offset, in whole or in part, the effects on total unit costs of (anticipated) less than full rates of utilization.

Twenty of the twenty-three firms responding to question 9a<sup>47</sup> indicated that they regarded the recent years a period of accelerated technological change. The general discussion which accompanied the executives' remarks made it clear that such developments were deemed far more rapid than anything previously experienced.

Thirteen of these twenty firms indicated that such changes had made for greater uncertainty as to the economic service lives of new equipment (question 9b) and nine of the same twenty firms stated that such uncertainty had caused them to retain equipment which otherwise would have been replaced (question 10b).

These answers do not necessarily convey a very accurate indication of the extent to which uncertainty influenced modernization expenditures, however. When asked to evaluate the importance of uncertainty as to rate of obsolescence, firms simply cited examples of postponed modernization and made no attempt to evaluate the general importance of this factor.

Two of the executives interviewed, however, gave very detailed accounts of the situation as it existed in their firms at the time of interview. The executives were in charge of the modernization programs in two large, progressive firms. Each was abreast of current technology as a result of company research, attend-

<sup>47</sup> Question 9a: Do you consider that the rate of technical advance in the textile industry in the last five years has resulted in more rapid obsolescence of equipment than in the previous period?

ance at textile machinery shows, and direct contact with machinery producers both here and abroad. Both executives discussed the various textile processes, pointing out what advances had recently been made in each and commenting on whether these developments were in the pilot stage or appeared to be fully developed. They also stated whether their companies were currently purchasing given types of equipment or postponing purchase. The general impression conveyed was that while some developments were considered as too uncertain for adoption there was an abundance of acceptable alternative projects at hand. Moreover, it appeared that in most instances equipment technology was proceeding at a relatively predictable pace from pilot stage to stage of adoption.

The impression was supported by smaller firms. The process of technological change in basic textile equipment was sufficiently slow that even they could proceed with considerable confidence. Some noted that not only was there a lapse of time between the appearance of pilot models and the availability of units for installation, but the productive capacity of the machinery producers was so limited that it would take years to equip the industry. Accordingly, firms desiring to proceed with caution could choose their modernization projects in such a way as to avoid facing a high probability of early obsolescence.

On the other hand, there were examples given in which technological obsolescence had been rapid and costly. Machinery used in the processing of twisted "stretch" yarns had a series of radical improvements, each of which made newly purchased machinery uneconomical almost as quickly as it was installed. An earlier but similar case pertained to combing equipment.

The general impression conveyed was that uncertainty as to rate of future obsolescence has not acted as a major deterrent to investment. There have been a series of technological changes, but they have tended to be centered first on one stage of textile processing and then on another. The amount of uncertainty in the rate of obsolescence was greater than in the past and varied among the firms, depending on the importance of the develop-

ment to the firm in its effort to remain competitive. When high levels of uncertainty are encountered by a firm, they appear to have been handled by giving the project in question a lower priority than would be indicated by the investment computation, or by simply postponing its consideration. This behavior is consistent with the use of varying cutoffs on years required for pay-back among a number of the firms using the pay-back approach in their investment computations.

All but one of the twenty-two firms answering question 7<sup>48</sup> stated that it did not regard uncertainty as to rate of utilization as an important consideration in individual modernization decisions. The reason was clear from the discussion which followed this question. Most modernization proposals involve improvements in basic textile processes. A given improvement, such as the introduction of metallic clothing used in carding equipment, cannot be isolated from the entire production process. Management does not think in terms of the probable rate of utilization of one type of equipment but of an entire mill or a major portion thereof. Moreover, since the final product is frequently cloth or yarn of standard construction many firms follow a policy of maintaining operation at or near capacity even at the cost of considerable accumulation of inventory.

Under such conditions management does not attempt to deal with the problem of weighing possibilities of variations in rate of utilization of the mill as a whole when replacing a given type of equipment. This is consistent with the previous finding that firms assume 100 per cent utilization in their computations.

This does not mean that firms do not face uncertainty regarding the future course of demand. Characteristic to the economics of the textile industry is that prices are relatively flexible, often varying from day to day and widely over the business cycle. In individual fabric markets margins between raw material costs and selling costs may be depressed by shifts in demand or increased

<sup>48</sup> Question 7: Are there frequently cases in which pay-back (or rate of return) prospects for new equipment meet your investment criteria but you do not undertake investment because of uncertainty as to whether equipment will be fully utilized?

foreign or domestic competition. In answering question 8<sup>49</sup> several companies called attention to the fact that competition could affect margins more than the rate of utilization. How is this type of uncertainty dealt with by management? It seems probable that changes in uncertainty of business prospects would alter the size of the budget which management will appropriate for modernization expenditures. This type of action was mentioned by several firms responding to question 30 which deals with investment policy during cyclical contraction. Certainly the data for expenditures already noted in Chapter 1 indicates a sensitivity to cyclical forces both by individual firms and the industry as a whole.

In summary, investment computations are typically based primarily on savings in labor costs and other explicit variable costs, to which depreciation liberalization is not directly relevant. But since the ultimate concern in these calculations is the effect on after-tax earnings, it is probable that the favorable effect of liberalization of depreciation will sooner or later also be taken into account.

The weight of changes in capital costs in the investment decision is not evident. Uncertainty as to obsolescence due to technological change has increased recently but there is no evidence that it has been so great as to impose a serious limitation on the total volume of acceptable projects. Firms handle this type of uncertainty informally, i.e., without explicit costing. They tend to postpone those projects whose technology is in a state of flux or to give such projects a lower priority. Similarly, where the investment decision involves the purchase of individual units of equipment, no explicit attempt is made to estimate the effect on overhead costs of uncertainty as to probable rate of utilization. Uncertainty as to future prices and profits is probably important, however. The history of cyclical instability in investment expen-

<sup>49</sup> Question 8: What are the major sources of uncertainty as to full utilization of proposed new equipment?

- a. Change in domestic demand for the product produced
- b. Increased foreign competition
- c. Increased domestic competition
- d. Other (specify)

ditures indicates that over-all prospects for the firm are important in determining the size of the capital expenditure budget.

While the adverse effects of accelerating obsolescence and uncertainty as to rate of utilization may not be explicitly measured in the investment decision, they are taken into account, at least informally. Depreciation liberalization tends to offset these inhibiting considerations.

#### INVESTMENT FORMULAS USED

All of the interviewed firms used more or less formal rules for evaluating investment proposals. While considerable diversity was evident in the details, all but one of the firms used some version of the pay-back computation. This formula computes the number of years required for the anticipated increase in net earnings resulting from the proposed investment to aggregate to the cost of the project. A widely used rule of thumb is that a project must be expected to pay back its costs—on a pretax basis—within five years if it is to be undertaken. But this rule is not universally followed, in fact, only a few firms indicated rigid adherence to any set rule. The types of investment formulas used for modernization projects (see Table 3) are summarized as follows:<sup>50</sup>

Pretax pay-back only (firms A-P)	16
After-tax pay-back only (firms Q-T)	4
Combination discounted cash flow and selected additional after-tax formulas (firms U, V)	2
Combination after-tax rate of return on investment and after-tax pay-back (firm W)	1
Combination after-tax pay-back and rate of return during pay-back period (firm X)	1
Combination after-tax rate of return and pretax pay-back (firm Y)	1

<sup>50</sup> There is no evidence indicating that the more profitable firms made use of more sophisticated investment formulas, but this is by no means conclusive. Among the sixteen firms using pretax pay-back formulas there were ten for which profit data were available. Seven of these had average rates of return on investment above the textile mill products industry average of 5.1 for the period 1954-62. Among the nine firms using some form of after-tax formula, profit data were available for five. Three of these had average rates of return of more than 5.1 per cent.



Sixteen firms restricted themselves to the use of pretax pay-back computations. The tax savings which result from the use of DDB or SYD methods or from shorter permitted tax depreciation lives were not made explicit.<sup>51</sup> For such firms, the results of the investment computation were exactly the same with or without liberalized tax depreciation.

Among the remaining nine cases, tax savings appear to be reflected by the formulas used by six firms (Q through V). The remaining three require special consideration.

The first of these three (firm W) stated that it chiefly relied on its estimated annual return on investment computation but used an after-tax pay-back (called "years required to cover cash outlay") as an additional measure. From the detailed description provided by the company it appears that the estimated annual return on investment computation did not reflect tax savings due to liberalized depreciation. The after-tax pay-back computation did reflect tax savings due to use of double declining balance depreciation, but not savings due to shorter depreciation lives.<sup>52</sup>

The second (firm X) made use of two computations: after-tax pay-back and rate of return during the pay-back period. The

<sup>51</sup> This group includes two firms which use pretax pay-back computations for ordinary modernization type computations but more elaborate computations where a new plant is considered (see Table 3).

<sup>52</sup> Firm W's procedure for computing annual return on investment does not make use of the discounted cash flow concept. The company computed an annual straight-line depreciation based on the expected service life of the equipment. This depreciation expense was deducted from expected annual savings and the remainder regarded as taxable income. The estimated income tax of 54 per cent was then deducted from the original estimate of savings to yield a residual called "average annual return." It is this average annual return which is used to compute a rate of return on the cost of the installation. In such a computation neither the tax recovery through use of DDB (the company's depreciation method) nor shorter tax depreciation lives is recognized. For the second measure the procedure was to compute "annual after-tax income" (equal to 46 per cent of the estimated cost savings) and then to add back an additional cash recovery due to tax avoidance equal to 54 per cent of straight-line depreciation multiplied by a constant of 1.3. The constant is intended to approximate the tax saving resulting from the use of DDB. The result is a figure called "annual cash recovery." Initial investment cost was then divided by annual cash recovery to yield "years required to recover cash outlay." It would appear that this computation does at least partially recognize tax savings as a result of DDB but it does not take account of shorter depreciation lives.

former is the more important, the latter being designed, according to management, to provide "an idea of the expected effect on the books of the company." Accelerated depreciation serves to improve the showing of a proposed investment by reducing the after-tax pay-back period but, on the other hand, it reduces the after-tax book profit estimates since a discounted cash flow type of computation is not used.<sup>53</sup> The executive did not appear to be aware that the two computations as used would reflect accelerated depreciation in contradictory ways.

The third (firm Y) was in a stage of transition from simple pre-tax pay-back to after-tax return on investment. The executive stated that both were used but that, through a process of education, management had come to place increasing reliance on the more sophisticated measure. There was still a tendency, however, to use the older computation.

These three firms made use of investment computations which at least partially reflect the improved returns or pay-back arising out of liberalized depreciation. There is, therefore, at least *prima facie* evidence that nine of the twenty-five firms (36 per cent) recognized such tax advantage in considering whether or not to adopt a modernization proposal.

Relatively few of the large firms relied only on the pretax pay-back formula. On the other hand, only one of the seven small companies used any sort of after-tax formula:

Pretax pay-back formula only	
Large	3
Medium	7
Small	6
Total	16

<sup>53</sup> In the after-tax pay-back computation both savings and SYD depreciation charges are projected for a number of years. Taxes are estimated each year based on savings less SYD depreciation. These estimated taxes are then deducted from savings (before depreciation charges) and the after-tax pay-back period is computed. In the second type of computation, however, both accelerated depreciation and taxes are charged as expenses in order to arrive at a figure called "annual savings after taxes (including depreciation)." These annual savings are averaged over the pay-back period (already computed above) to provide an "average estimated annual book profit during the pay-back period." This average book profit is then converted to a return on investment during the pay-back period.

After-tax formulas, all types	
Large	5
Medium	3
Small	1
Total	9

In other words, the larger firms which account for a substantial part of the total investment in the industry show a greater tendency to use the kind of formula in which depreciation changes are explicitly taken into account. Thus we see that the importance of the demand effect as a route by which liberalized depreciation influences modernization is somewhat greater than is indicated by the proportion of firms employing after-tax formulas.

#### INDIRECT DEMAND EFFECTS

As was previously noted, it is possible that liberalized depreciation legislation may cause management to relax the standard by which it judges the acceptability of proposed projects even where pretax formulas are used. For example, let us suppose that management uses pretax pay-back computations and traditionally has made use of a five year pay-back cutoff point. Realizing that the tax law changes result in a more favorable after-tax pay-back on a project, it might continue to use the old formula as a matter of simplicity in making computations but raise the acceptable cutoff point to, say, six years. Under such conditions we would observe that the firm is using a pretax formula but that liberalized depreciation has nevertheless served to increase the number of projects for which management is willing to appropriate funds.

In order to investigate this possibility executives were asked the following question (Question 25): What is your understanding of the benefit you derive from more liberal depreciation provisions? a. Increased cash flow? b. Shorter pay-back period after taxes or higher rate of return?

In general, answers indicate a lack of awareness by firms using pretax formulas that liberalized depreciation acts to reduce the after-tax pay-back period or to increase the rate of return. In most cases these firms ignored the second part of the question

or answered it in the negative. Four of the sixteen firms using such formulas did state that they understood that such an effect was possible, but two of these stated that in practice they ignored it.

On the other hand, those firms using after-tax formulas tended to show an awareness of the demand effect, although executives of three failed in their answers to recognize that an improved pay-back or rate of return resulted from liberalized depreciation.

Taken as a whole the evidence points to relatively little "indirect" recognition of the demand effect on the part of firms using pretax formulas. Additional firms may, however, recognize the demand effect as time passes. The way is open for a "learning process." It is not unreasonable to expect management to alter its rules of thumb or to change its formulas after it has lived with the new provisions for a time.

In this connection, it is important to point out once again that firms based their modernization decisions largely upon analysis of savings in variable costs. There is no lack of evidence that the investment formula plays the key role in this type of investment decision. It is our opinion that this fact increases the likelihood of a learning process occurring through time. If the decision were largely intuitive it would be far more difficult for management to become aware of the effect of liberalized tax depreciation on profits than is the case when cost computations are continuously being examined and cost concepts reviewed.

#### THE DEMAND EFFECT AND THE CHOICE BETWEEN MODIFICATION AND PURCHASE

In discussing the possible effect of depreciation liberalization on the choice between modification of old equipment and purchase of new it is important to recall that liberalized depreciation will have its principal effect on marginal investment decisions. It was noted at that time that "where the investment proposal is extremely attractive (e.g., pay-back in two years) or where it is absolutely essential for the continued operation of the business . . . the firm will somehow manage the financing and make the

expenditure regardless of tax considerations. The effectiveness of the tax change depends upon the quantity of projects which lie at the threshold of decision. . . ."

A solid finding from the interviews is that in the past the modification alternative has in a very large proportion of cases been so much more attractive an alternative than purchase of new equipment, that the issue of whether to modify or purchase has frequently not lain at "the threshold of decision." All of the firms responding to questions 11a and 11b<sup>54</sup> indicated that they had been confronted in the past by the alternative of modifying existing equipment versus purchasing entirely new equipment and that on many such occasions modification was "just as good" or "almost as good" and much cheaper. This was particularly true of much of the modification which had taken place earlier in spinning and the modification of carding equipment which was occurring at time of interview throughout the industry.

On the other hand, a wide variety of experience was noted. Several firms indicated that modification was often "at best a compromise" or that new equipment frequently works out in practice to be a much better alternative than it appears to be on a strictly pay-back basis, presumably because of better quality and lower maintenance, or because the original computations underestimated the savings eventually realized. In general, it was found that the desirability of modification depends upon the process involved (some processes cannot be modified at all), the age of the equipment (several firms indicated that they refuse to modify very old equipment even when it appears to offer an attractive pay-back), the type of fabric or fiber (where the fabric is of high yarn count or high quality or where expensive synthetics are being used new equipment is preferable), and the extent to which modification has occurred in the past (where modification has already occurred further modification is frequently

<sup>54</sup> Question 11a: In considering proposals for modernization are you confronted with the alternative of modifying existing equipment versus purchasing entirely new equipment?

Question 11b: Where such alternatives exist is it typical that new equipment offers substantially greater efficiency than modification (do not consider costs and dollar returns in answering this question)?

not feasible). Several firms indicated that modification was a compromise which was made when the prospects for technological development were sufficiently uncertain<sup>55</sup> that purchase of new equipment seemed undesirable.

The impression received is that, with the exception of modification of carding equipment, the industry is nearing the end of an era of modification and that purchase of new equipment might reasonably be expected in the future. This impression was gained largely from discussion with several executives regarding the state of technology as it has affected their firms. In addition, several other firms indicated that modification was no longer an important alternative for them.

The above sheds little light, however, on the question of whether or not liberalized depreciation has resulted in firms purchasing new equipment rather than modifying old. Here, as when the alternatives are simply replacement or continued use of existing equipment, the influence of liberalized depreciation may occur as a result of the "demand effect," the "cash flow" effect, or an effect on management attitudes.

Question 13<sup>56</sup> was asked to determine the extent of influence of liberalized depreciation on this type of management decision. Sixteen firms responded to the question. Of these, eight answered in the affirmative, of which three answered that by increasing cash flow liberalized depreciation would make it possible to purchase new equipment which would require larger initial outlays of funds. Another stated that by permitting the firm "to get its money out of a piece of equipment earlier" it would increase the likelihood of replacement.

The remaining four indicated that the effect of liberalized depreciation on rate of return or after-tax pay-back of proposed new equipment would be to increase the tendency to purchase new rather than modify old equipment. It should be noted that

<sup>55</sup> Question 12: Where the decision has been in favor of modification what factors other than pay out have influenced your firm to modify old equipment rather than purchase new?

<sup>56</sup> Question 13: Is it your impression that liberalized depreciation laws have altered, or could alter, a decision in favor of purchasing new equipment rather than modifying old equipment? Please explain your position.

these four firms were among those previously designated as making use of after-tax investment formulas and, therefore, presumably were influenced in their modernization decisions by demand effects.

The interview evidence suggests an affirmative answer to the question asked at the beginning of the chapter: "Has depreciation liberalization acted via the demand effect to increase modernization outlays?" While the additional riskiness of such investment resulting from acceleration of technological progress does not appear to be a dominant concern, neither is it ignored in the investment decision. The more liberal tax treatment of depreciation tends to offset this impediment to modernization outlays. The formulas used for investment decision-making varied widely, but in nine of the twenty-five firms, the formulas were such that changes in depreciation rules would affect the measured profitability or desirability of the proposed investments. Finally, in several of the firms, particularly those using after-tax pay-back or rate of return formulas, depreciation liberalization encouraged modernization by purchasing new facilities rather than modifying existing equipment.